III. IN THE CLAIMS:

1. (Original) A method of filtering successive received signal samples, a group of N successive samples forming a received sample vector of digital data having a N x 1 dimension to provide an approximate desired signal comprising:

b generating a set of basis vectors where each successive basis vector is a function of a given or an estimated steering vector and successively greater powers of a covariance matrix for a sequence of received sample vectors of data with the initial basis vector being formed from the steering vector;

c generating a reduced rank vector of digital data having a D x 1 dimension, where D is less than N, from a matrix of D basis vectors and a received sample vector of data;

d generating a D x 1 filter coefficient vector from the generated basis vectors; and

e generating the approximate desired signal from the filter coefficients and the reduced rank vector of data.

2. (Original) A method of filtering successive received signal samples as recited in claim 1 where D + 1 successive basis vectors are generated by multiplying an immediately preceding basis vector of data by the covariance matrix for the received sample vector.

3. (Presently Amended) A method of filtering successive received signal samples as recited in claim 1 wherein the reduced rank vector is generated by multiplying ~~the~~ a Hermitian transpose of the matrix of basis vectors by the received sample vector of data.

4. (Presently Amended) A method of filtering successive received signal samples as recited in claim 1 including forming a D x 1 correlation vector with correlation scalars, each correlation scaler γ_i formed by multiplying ~~the~~ a Hermitian transpose of the initial basis vector by the i^{th} basis vector for i equal 0 through D-1.

5. (Original) A method of filtering successive received signal samples as recited in claim 4 including forming a D x D correlation matrix Γ from 2D-1 correlation scalars generated from pairs of the basis vectors and generating a D x 1 vector of filter coefficients $\tilde{c}$ by solving a set of linear equations defined by $\Gamma\tilde{c} = y$ where y is the correlation vector.

6. (Original) A method of filtering successive received signal samples as recited in claim 1 including generating the desired signal by multiplying a Hermitian transpose of the filter coefficient matrix by the reduced rank vector of data.

7. (Original) A method of filtering successive received signal samples, a group of N successive samples forming a received sample vector of digital data having a N x 1 dimension to provide an approximate desired signal comprising:

determining a received sample covariance matrix from a sequence of received sample vectors of digital data;

determining a steering vector of data;

generating a reduced rank vector of digital data having a D x 1 dimension where D is less than N from the received sample vector of data and a matrix of D basis vectors of data wherein each successive basis vector of data is generated by multiplying an immediately preceding basis vector of data by the covariance matrix and the initial basis vector is formed from the steering vector of data;

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generating D filter coefficients from a plurality of correlations between pairs of basis vectors of data; and

generating the approximate desired signal from the filter coefficients and the reduced rank vector of data.

8. (Presently Amended) A method of filtering successive received signal samples as recited in claim 7 wherein the reduced rank vector is generated by multiplying ~~the~~ a Hermitian transpose of the matrix of basis vectors by the received sample vector of data.

9. (Presently Amended) A method of filtering successive received signal samples as recited in claim 7 including forming a D x 1 correlation vector with correlation scalars, each correlation scaler γ_i formed by multiplying ~~the~~ a Hermitian transpose of the initial basis vector by the i^{th} basis vector for i equal 0 through D-1.

10. (Original) A method of filtering successive received signal samples as recited in claim 9 including forming a D x D correlation matrix Γ from 2D-1 correlation scalars generated from pairs of the basis vectors and generating a D x 1 vector of filter coefficients $\widetilde{c}$ by solving a set of linear equations defined by $\Gamma\widetilde{c} = y$ where y is the correlation vector.

11. (Original) A method of filtering successive received signal samples as recited in claim 7 including generating the desired signal by multiplying a Hermitian transpose of the filter coefficient matrix by the reduced rank vector of data.

12. (Original) A method of filtering successive received signal samples, a group of N successive samples forming a received sample vector of digital data having a N x 1 dimension to provide an approximate desired signal comprising:

generating D + 1 basis vectors wherein D is less than N and each successive basis vector is a function of a given or an estimated steering vector and successively greater powers of a covariance matrix for a sequence of the received sample vectors of data with the first basis vector being formed from the steering vector;

generating a reduced rank vector of digital data having a D x 1 dimension from a matrix of D basis vectors and a received sample vector of data;

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generating 2 D - 1 correlations between pairs of basis vectors;

generating D filter coefficients from a matrix of said correlations and a vector of D correlations; and

generating the approximate desired signal from the filter coefficients and the reduced rank vector of data.

13. (Original) A method of filtering successive received signal samples as recited in claim 12 where D + 1 successive basis vectors are generated by multiplying an immediately preceding basis vector of data by the covariance matrix for the received sample vector.

14. (Presently Amended) A method of filtering successive received signal samples as recited in claim 12 wherein the reduced rank vector is generated by multiplying ~~the~~ a Hermitian transpose of the matrix of basis vectors by the received sample vector of data.

15. (Presently Amended) A method of filtering successive received signal samples as recited in claim 12 including forming a D x 1 correlation vector with correlation scalars, each correlation scaler γ_i formed by multiplying ~~the~~ a Hermitian transpose of the initial basis vector by the i^{th} basis vector for i equal 0 through D-1.

16. (Original) A method of filtering successive received signal samples as recited in claim 15 including forming a D x D correlation matrix Γ from 2D-1 correlation scalars generated from pairs of the basis vectors and generating a D x 1 vector of filter coefficients $\tilde{c}$ by solving a set of linear equations defined by $\Gamma\tilde{c} = y$ where y is the correlation vector.

17. (Original) A method of filtering successive received signal samples as recited in claim 12 including generating the desired signal by multiplying a Hermitian transpose of the filter coefficient matrix by the reduced rank vector of data.

18. (Currently Amended) A method of filtering successive received signal samples, a group of N successive samples forming a received sample vector of digital data having a N x 1 dimension to provide an approximate desired signal comprising:

selecting a dimension D for a reduced rank vector onto which a received sample vector of data is projected, where D is less than N;

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generating a set of basis vectors wherein each successive basis vector is a function of a given or an estimated steering vector and successively greater powers of a covariance matrix <u>for</u> a sequence of received sample vectors of data with the first basis vector being formed from the steering vector;

generating a reduced rank vector of digital data having a D x 1 dimension from a matrix of D basis vectors and the received sample vector of data;

generating D filter coefficients from the generated basis vectors; and

generating the approximate desired signal from the filter coefficients and the reduced rank vector of data.

19. (Original) A method of filtering successive received signal samples as recited in claim 18 where D is selected to be less than or equal to 8.

20. (Original) A method of filtering successive received signal samples as recited in claim 18 where D is selected to minimize an *a posteriori* Least Squares cost function.

21. (Original) A method of filtering successive received signal samples as recited in claim 20 where D + 1 successive basis vectors are generated by multiplying an immediately preceding basis vector of data by the covariance matrix for the received sample vector.

22. (Presently Amended) A method of filtering successive received signal samples as recited in claim 20 wherein the reduced rank vector is generated by multiplying ~~the~~ a Hermitian transpose of the matrix of basis vectors by the received sample vector of data.

23. (Presently Amended) A method of filtering successive received signal samples as recited in claim 20 including forming a D x 1 correlation vector with correlation scalars, each correlation scaler γ_i formed by multiplying ~~the~~ a Hermitian transpose of the initial basis vector by the i^{th} basis vector for i equal 0 through D-1.

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24. (Original) A method of filtering successive received signal samples as recited in claim 23 including forming a D x D correlation matrix Γ from 2D-1 correlation scalars generated from pairs of the basis vectors and generating a D x 1 vector of filter coefficients $\tilde{c}$ by solving a set of linear equations defined by $\Gamma\tilde{c} = y$ where y is the correlation vector.

25. (Original) A method of filtering successive received signal samples as recited in claim 20 including generating the desired signal by multiplying a Hermitian transpose of the filter coefficient matrix by the reduced rank vector of data.